ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *MKS Instruments 690A13TRA* at our website: ***Click HERE***

mks
Technology for Productivity

Pressure & Measurement Control

WWW.MKSINST.COM

Analog 600 Series Selection Guide

BARATRON® ABSOLUTE CAPACITANCE MANOMETERS



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

600 Series Analog Capacitance Manometers

The MKS 600 Series Baratron® absolute analog capacitance manometers represent a large family of RoHS products that are designed for accurate, repeatable pressure and vacuum measurements in demanding production or research process environments. The proven sensor, electronics, and packaging designs combine to provide the most stable and reliable low-pressure measurement instrument available. A few of the features and benefits include:

- Full-scale pressure/vacuum ranges as low as 0.02 Torr (mm Hg) allow for accurate measurement of vacuum as low as 2 x 10^{-4} Torr (1.5 x 10^{-4} mbar)
- All products are specified in percent of reading for best accuracy and improved process yield
- Complete line of absolute manometers including products operating at internal temperatures of up to 200°C. Widest product range and applications experience available anywhere
- Direct measurement of chamber total pressure independent of gas type or composition, eliminating need for lookup tables and conversion factors
- Best-available long-term output stability ensures state-of-the-art process repeatability in nearly any application
- Inconel® and Incoloy® nickel alloy construction of basic sensor operates without damage in virtually any chemical environment, including halogens, de-ionized water and steam, and ozone
- High overpressure limit ensures reliability from occasional system mishaps
- CE Mark for use worldwide, and products with trip relays have UL-listed electromechanical relays
- RoHS (Reduction of Hazardous Substances) compliant

Product Description

The MKS 600 Series Baratrons are analog capacitance-based pressure and vacuum gauges that require ±15VDC input power and provide a high-level 0-10VDC output signal linear with pressure. This analog output can be interfaced with an MKS pressure controller, an MKS power supply/display instrument, or any instrument that meets these requirements. Changes in pressure/vacuum are determined by measuring the change in capacitance between the sensor's diaphragm and an adjacent electrode disk. This capacitance change is converted to a useable output by patented signal-conditioning electronic circuits. The radially-tensioned Inconel diaphragm in the sensor provides very fast response (<20 msec in many cases), low hysteresis, excellent repeatability, very high resolution (to 0.001% of full scale), exceptionally high corrosion resistance, and double-walled welded construction for operator safety. The sensor itself can withstand repeated exposures to 45 PSIA (3.1 bar) without permanent degradation or shifting, allowing it to operate in virtually any process system.

Baratron Chart

MKS offers more sixteen (16) different products within the 600-series family with different attributes, capabilities, and performance. A quick summary of these models is below, followed by individual descriptions of each product and its major applications.

Product Family	Sensor	Output	Operating Temperature	Primary Full Scale Ranges - Torr*	Secondary Full Scale Range - Torr*	Electrical Connector	Relay Switches
622B	Standard	0-10VDC analog	Ambient	1 to 1,000	Not available	Terminal Block	No
623B	Standard	0-10VDC analog	Ambient	10 to 1,000	Not available	Terminal Block	Yes
624D	Standard	0-10VDC analog	45°C	1 to 20,000	Not available	15-pin D-subminiature	Yes
625D	Standard	0-10VDC analog	100°C	1 to 20,000	Not available	15-pin D-subminiature	Yes
626B	Standard	0-10VDC analog	Ambient	0.1 to 1000	Not available	15-pin D-subminiature	No
627D	Standard	0-10VDC analog	45°C	0.02 to 20,000	Not available	15-pin D-subminiature	No
628D	Standard	0-10VDC analog	100°C	0.05 to 20,000	Not available	15-pin D-subminiature	No
629D	Standard	0-10VDC analog	45°C or 100°C	0.02 to 1,000**	Not available	9-pin D-subminiature	No
631C	Standard	0-10VDC analog	150°C or 200°C	1 to 1,000	Not available	15-pin D-subminiature	Optional
D24D	Standard	0-10VDC analog	45°C	10 to 1,000	2X, 5X, or 10X lower than primary range	15-pin D-subminiature	Yes
D25D	Standard	0-10VDC analog	100°C	10 to 1,000	2X, 5X, or 10X lower than primary range	15-pin D-subminiature	Yes
D27D	Standard	0-10VDC analog	45°C	10 to 1,000	2X, 5X, or 10X lower than primary range	15-pin D-subminiature	No
D28D	Standard	0-10VDC analog	100°C	10 to 1,000	2X, 5X, or 10X lower than primary range	15-pin D-subminiature	No
E27D	Etch Baffle	0-10VDC analog	45°C	0.02 to 100	Not available	15-pin D-subminiature	No
E28D	Etch Baffle	0-10VDC analog	100°C	0.05 to 100	Not available	15-pin D-subminiature	No
E29D	Etch Baffle	0-10VDC analog	45°C or 100°C	0.02 to 100**	Not available	9-pin D-subminiature	No

Notes:
**Other units of measurement available; contact factory.*
***0.02 Torr range available only on 45°C models.*

A very partial list of applications for the 600 series of products include:

- All semiconductor thin-film processes such as etching and ashing, chemical vapor deposition, physical vapor deposition, oxidation, diffusion, and implantation.
- Production of electronic displays such as LCDs, plasma displays, and CRTs.
- Manufacturing of advanced ceramics and metals for aerospace and transportation.
- Automated leak test systems for industrial and scientific use.
- Sterilization and freeze-drying of biopharmaceuticals, foods, medical implants, and surgical instruments.
- Analytical and metrology instruments such as mass spectrometers, high-precision balances, calibration standards, and other analytical tools.
- Production of data storage components such as laser diodes, magnetic read/write heads, and storage platters.



Types 622B, 623B, and 626B Ambient-Temperature Baratrons

The Types 622B, 623B, and 626B Baratrons are unheated, and thus are the most economical of all of the 600-series family of products. They are available in full-scale pressure/vacuum ranges from 0.1 to 1000 Torr (and metric equivalents) and are suited for many industrial, electronic, and research applications. The 622B has a terminal block electrical connector without relays, the 626B uses a 15-pin D-subminiature electrical connector without relays, and the Type 623B product adds two (2) independently-adjustable trip relays to control external equipment.



Types 627D, 628D, and 629D Heated Baratrons

The Types 627D, 628D, and 629D are temperature-controlled capacitance manometers that are much less affected by ambient temperature changes than unheated Baratrons. Heating the sensor also reduces or eliminates the possibility of process byproducts depositing inside the manometer to cause drift, which can have a significant effect on system availability and repeatability. They are available in lower full-scale pressure ranges than unheated products, which permits their use in more demanding processes. All of the models are internally regulated to their specified operating temperature; no external controllers, cables, or sensors are needed. The Types 627D and 628D operate at 45°C and 100°C respectively, and have a 15-pin D-subminiature electrical connector. They also have an option for “Heater Status” and “At Temperature” LED indicators and relay contact. The Type 629D can be configured to operate at either temperature, and uses a 9-pin D-subminiature electrical connector for “drop-in” compatibility with many competitive products. The Type 629D also offers an optional external zero set capability, allowing its zero to be set remotely – a major advantage in many process tools that do not permit easy access to the capacitance manometer. The 45°C Type 627D offers full-scale pressure/vacuum ranges from 0.02 to 20,000 Torr (0.026 mbar to 26.3 bar), and the 100°C Type 628D has pressure/vacuum ranges from 0.05 to 20,000 Torr (0.066 mbar to 26.3 bar).



Types 624D and 625D Heated Baratrons with Integral Process Control Relays

These heated capacitance manometers are identical to the Types 627D and 628D Baratrons described above except that they add two (2) internally-mounted, independently-adjusted electromechanical relays that can be set to open or close at any pressure from 0.1% to 100% of the product’s full-scale measurement range. These relays can be used to control external equipment, such as isolation valves, other high vacuum gauges (such as hot-filament ionization gauges), drive motors, etc. They are available in full-scale measurement ranges from 10 to 1000 Torr (13 to 1333 mbar).

Capacitance Manometers



Type 631C High Temperature Baratron

The Type 631C is a high-temperature capacitance manometer, operating at either 150°C or 200°C. It was specifically designed for the most difficult semiconductor and biopharmaceutical applications known today, such as nitride CVD and DI-steam sterilization. It is completely self-contained, requiring only ±15VDC input power and providing a 0-10VDC analog output signal that is linear with pressure. It is about 40% smaller in its physical size and draws 40% less electrical power than earlier products, making it an ideal choice to upgrade existing systems with 100°C or higher temperature capacitance manometers. In standard form, it includes LED indicators for “At Temperature” and “Heater Failure”. The product is also offers the option of two (2) internally-mounted, independently-adjustable electromechanical trip relays that can be set to open or close at any pressure between 0.1% and 100% of the manometer’s measurement range. Full-scale measurement ranges from 1 to 1000 Torr (1.33 to 1333 mbar) are available.



Types E27D, E28D, and E29D Heated Baratrons with Etch Sensor

For certain semiconductor and industrial manufacturing processes, heating the Baratron to 100°C is sometimes not enough to prevent deposition of process byproducts that cause drift in the manometer’s output and undesirable process excursions. For these difficult processes, MKS offers a heated capacitance manometer with a patented etch baffle in its sensor, which forces condensable process byproducts to deposit on a baffle before reaching the sensor’s diaphragm measurement element. This greatly reduces the amount of zero drift in the Baratron, which in turn improves the overall Cost of Ownership and process accuracy. These products are available in full-scale measurement ranges as low as 0.02 Torr (0.27 mbar), and with either 15-pin D-sub-miniature (Types E27D and E28D) or 9-pin D-subminiature (Type E29D) electrical connectors.



Types D24D, D25D, D27D, and D28D Dual-Range Baratrons

These products are designed for processes where the customer wishes to measure and control the process over a very wide pressure range. Standard single-range Baratrons can be used in pressure control systems down to at least 0.1% of their full-scale range, but at pressures below 0.05% of full-scale, the analog output of the manometer is low enough that some pressure controllers may not be able to resolve the signal correctly. The dual-range Baratrons solve that problem by adding a second output signal that is 2X, 5X, or 10X higher in gain than the primary range, which increases the analog output signal by that same amount. These Baratrons are heated to either 45°C or 100°C, are available with or without internally-mounted process relays, and have a single 15-pin D-subminiature electrical connector. Primary pressure ranges from 10 to 1000 Torr (13 to 1333 mbar) are available, and the secondary pressure range is 2X, 5X, or 10X less than the primary range.

Baratron 600-Series Capacitance Manometers	Type 622B	Type 623B	Type 626B	Type 627D	Type 628D	Type 629D	Type 624D
	Ambient, Terminal Block Connector	Ambient, Terminal Block Connector, Relays	Ambient, 15-pin D-connector	Heated to 45°C, 15-pin D-connector	Heated to 100°C, 15-pin D-connector	45°C or 100°C, 9-pin D-connector	Heated to 45°C, 15-pin D-connector, Relays
Full Scale Pressure Ranges - Torr (mbar)	1, 2, 10, 20, 100, 500 and 1000 (1.33 to 1333)	10, 20, 100, 500 and 1000 (13.3 to 1333)	0.1, 0.25, 1, 2, 10, 20, 100, 500 and 1000 (0.13 to 1333)	0.02, 0.05, 0.1, 0.25, 1, 2, 10, 20, 100, 1000, 2000, 5000, 10000, 15000, and 20000 (0.026 to 26315)	0.05, 0.1, 0.25, 1, 2, 10, 20, 100, 1000, 2000, 5000, 10000, 15000, and 20000 (0.066 to 26315)	0.02, 0.05, 0.1, 0.25, 1, 2, 10, 20, 100, 1000, 2000, 5000, 10000, 15000, and 20000 (0.026 to 26315)	1, 10, 20, 100, 500, 1000, 2000, 5000, 10000, 15000, and 20000 (1.33 to 26315)
Accuracy - % of reading	0.25%	0.25%	0.25%	0.12% for 1 Torr and above; 0.15% for 0.25, 0.1, and 0.05 Torr; 0.25% for 0.02 Torr	0.25% for 1 Torr and above; 0.50% for below 1 Torr	For 45°C models: 0.12% for 1 Torr and above; 0.15% for 0.25, 0.1, and 0.05 Torr. For 100°C models: 0.25% for 1 Torr and above; 0.50% for below 1 Torr.	0.12%
Resolution - % of full scale	0.001%	0.001%	0.001%	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001%
Zero Temperature Coefficient - % FS/°C	0.005% for 10 Torr and higher; 0.010% for 2 Torr; and 0.015% for 1 Torr	0.005%	0.005% for 10 Torr and higher; 0.010% for 2 Torr; and 0.015% for 1 Torr	0.002% for 1 Torr and higher; 0.005% for 0.1 and 0.25 Torr; 0.015% for 0.05 Torr; 0.030% for 0.02 Torr	0.002% for 1 Torr and higher; 0.010% for 0.1 and 0.25 Torr; 0.015% for 0.05 Torr	Same as 627B and 628B specifications for 45°C and 100°C temperatures	0.002%
Span Temperature Coefficient - % reading/°C	0.04%	0.04%	0.04%	0.02%	0.02%	0.02%	0.02%
Ambient Operating Temperature	0 to 50°C	0 to 50°C	0 to 50°C	15 to 40°C	15 to 50°C	45°C models: 15 to 40°C. 100°C models: 15 to 50°C.	15 to 40°C
Warmup Time	30 minutes	30 minutes	30 minutes	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours for 1 Torr and higher; 4 hours for <1 Torr
Overpressure Limit	45 psia	45 psia	45 psia	45 psia	45 psia	45 psia	45 psia
Materials Exposed to Process Gases (excluding optional fittings)	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys
Exposed Volume - cm^3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Input Power Requirements*	±15VDC (±5%) @ 35 mA	±15VDC (±5%) @ 75 mA	±15VDC (±5%) @ 35 mA	±15VDC (±5%) @ 250 mA max	±15VDC (±5%) @ 500 mA max	Same as 627B and 628B specifications for 45°C and 100°C temperatures	±15VDC (± 5%) @ 400 mA max
Output Signal	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms
Trip Relay Specifications	Not Applicable	(2) independent relays, SPDT contacts rated at 1 amp @ 30VDC or 0.5 amp @ 30 VAC resistive. Each relay adjustable from 0.1% to 100% of FS range. 12.5 Kohm max source impedance.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	(2) independent relays, SPDT contacts rated at 1 amp @ 30VDC or 0.5 amp @ 30 VAC resistive. Each relay adjustable from 0.1% to 100% of FS range. 12.5 Kohm max source impedance.
Electrical Connector(s)	5-post terminal strip	(2) terminal strips, (1) 5-post and (1) 8-post	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	9-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks
Connection Fitting - Standard	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation
Connection Fittings - Optional**	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, 8 Female VCO, 2.75" OD Conflat, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF
EMC Compatibility	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/ EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant
Catalog Options	None	None	None	Temperature/Heater Status LEDs; 15-pin D-connector with slide locks	Temperature/Heater Status LEDs; 15-pin D-connector with slide locks	Heater Status Indication; External Zero Adjust (not available on 0.02 Torr/45°C or 0.05 Torr/100°C configurations	15-pin D-connector with slide locks; Terminal Block Adaptor

**24VDC input power available for some models; contact MKS Applications for assistance.*
***Not all fittings available for all pressure ranges; contact MKS Applications for assistance.*

Specifications

Type 625D	Type 631C	Type E27D	Type E28D	Type E29D	Type D24D	Type D25D	Type D27D	Type D28D
Heated to 100°C, 15-pin D-connector, Relays	**150°C or 200°C, 15-pin D-connector, Relays Optional**	**Etch Sensor, 45°C, 15-pin D-connector**	**Etch Sensor, 100°C, 15-pin D-connector**	**Etch Sensor, 45°C or 100°C, 9-pin D-connector**	**Dual Range, 45°C, 15-pin D-connector, Relays**	**Dual Range, 100°C, 15-pin D-connector, Relays**	**Dual Range, 45°C, 15-pin D-connector**	**Dual Range, 100°C, 15-pin D-connector**
1, 10, 20, 100, 500, 1000, 2000, 5000, 10000, 15000, and 20000 (1.33 to 26315)	1, 2, 10, 100, and 1000 (1.33 to 1333)	0.02, 0.05, 0.1, 0.25, 1, 2, 10, 20, and 100 (0.026 to 133)	0.05, 0.1, 0.25, 1, 2, 10, 20, and 100 (0.026 to 133)	0.02, 0.05, 0.1, 0.25, 1, 2, 10, 20, and 100 (0.026 to 133)	10, 100, and 1000 (13.3 to 1333)	10, 100, and 1000 (13.3 to 1333)	1, 10, 100, and 1000 (1.33 to 1333)	1, 10, 100, and 1000 (1.33 to 1333)
0.25%	0.50%	0.12% for 1 Torr and above; 0.15% for 0.25, 0.1, and 0.05 Torr; 0.25% for 0.02 Torr	0.25% for 1 Torr and above; 0.50% for below 1 Torr	For 45°C models: 0.12% for 1 Torr and above; 0.15% for 0.25, 0.1, and 0.05 Torr. For 100°C models: 0.25% for 1 Torr and above; 0.50% for below 1 Torr.	0.12%	0.25%	0.12%	0.25%
0.001%	0.001%	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001% for 0.10 Torr and higher; 0.002% for <0.10 Torr.	0.001%	0.001%	0.001%	0.001%
0.002%	150°C models: 0.004% for 10 Torr and higher; 0.006% for 1 and 2 Torr. 200°C models: 0.008% for 10 Torr and higher; 0.016% for 1 and 2 Torr.	0.002% for 1 Torr and higher; 0.005% for 0.1 and 0.25 Torr; 0.015% for 0.05 Torr; 0.030% for 0.02 Torr	0.002% for 1 Torr and higher; 0.010% for 0.1 and 0.25 Torr; 0.015% for 0.05 Torr	Same as E27B and E28B specifications for 45°C and 100°C temperatures.	0.002%	0.002%	0.002%	0.002%
0.02%	0.10%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
15 to 50°C	15 to 50°C	15 to 40°C	15 to 50°C	45°C models: 15 to 40°C. 100°C models: 15 to 50°C.	15 to 40°C	15 to 50°C	15 to 40°C	15 to 50°C
2 hours for 1 Torr and higher; 4 hours for <1 Torr	4 hours	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours for 1 Torr and higher; 4 hours for <1 Torr	2 hours	2 hours	2 hours	2 hours
45 psia	45 psia	45 psia	45 psia	45 psia	45 psia	45 psia	45 psia	45 psia
Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys	Inconel and Incoloy alloys
6.3	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
+/-15VDC (+/- 5%) @ 600 mA max	+/-15VDC (+/- 5%) @ 1.0 A max	+/-15VDC (+/- 5%) @ 250 mA max	+/-15VDC (+/- 5%) @ 500 mA max	Same as E27B and E28B specifications for 45°C and 100°C temperatures.	+/-15VDC (+/- 5%) @ 400 mA max	+/-15VDC (+/- 5%) @ 600 mA max	+/-15VDC (+/- 5%) @ 250 mA max	+/-15VDC (+/- 5%) @ 500 mA max
0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms	0-10VDC into > 10 k-ohms
(2) independent relays, SPDT contacts rated at 1 amp @ 30VDC or 0.5 amp @ 30 VAC resistive. Each relay adjustable from 0.1% to 100% of FS range. 12.5 Kohm max source impedance.	(2) process pressure & (1) heater failure trip relay mounted internally. Pressure relays independently adjustable from 0-100% FS, DPDT contacts rated at 1 amp @ 30VDC or 0.5 amps @ 30VAC. Relays conform to UL-1950 Basic Insulation at 125V.	Not Applicable	Not Applicable	Not Applicable	(2) independent relays, SPDT contacts rated at 1 amp @ 30VDC or 0.5 amp @ 30 VAC resistive. Each relay adjustable from 0.1% to 100% of FS range. 12.5 Kohm max source impedance.	(2) independent relays, SPDT contacts rated at 1 amp @ 30VDC or 0.5 amp @ 30 VAC resistive. Each relay adjustable from 0.1% to 100% of FS range. 12.5 Kohm max source impedance.	Not Applicable	Not Applicable
15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	9-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks	15-pin D-subminiature with thread locks
1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation	1/2" OD (12.7 mm) tubulation
8 Female VCR, 1.33" OD Conflat, NW16-KF	8 Female VCR, NW16-KF, 1.5" OD TriClover, 2" OD TriClover	8 Female VCR, 1.33" OD Conflat, NW16-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, NW25-KF	8 Female VCR, 1.33" OD Conflat, NW16-KF, NW25-KF
Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant	Fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends. RoHS compliant
15-pin D-connector with slide locks; Terminal Block Adaptor	Relay Settings	Heater Status Indication; Horizontal Calibration	Heater Status Indication; Horizontal Calibration	Heater Status Indication; External Zero Adjust (not available on 0.02 Torr/45°C or 0.05 Torr/100°C configurations; Horizontal calibration	15-pin D-subminiature with slide locks	15-pin D-subminiature with slide locks	15-pin D-subminiature with slide locks	15-pin D-subminiature with slide locks

Displays, Power Supplies, and Isolation Systems

For customers who do not wish to arrange for their own delivery of electrical power to their Baratron(s), MKS offers four (4) different displays and power supplies that can be used with most of the products described above. The descriptions below give a basic idea of the different models and their attributes.



Type 146C Multi-Gauge Controller

The Type 146C vacuum gauge controller has the ability to power from one to four (4) Baratrons of different configurations via its plug-in function cards – or it can operate any combination of up to four (4) Baratrons, mass flow controllers, high-vacuum gauges, indirect vacuum gauges, and pressure control valves all from one instrument. Its large LCD display provides a high-resolution digital display of the pressure or vacuum, and it can accommodate Baratron capacitance manometers with a total current draw of up to 2.0 amps at ±15VDC input power. Two (2) electro-mechanical relays are standard in the base product and can be assigned to any active channel in the controller. Additional cards can be ordered that can add up to six (6) more such relays for complex system management. It also has an RS232C digital interface as standard, and can be operated on nearly source of AC power worldwide.



Type PR4000 Display/Power Supply

The PR4000 display can operate one or two of any current 600-series Baratron capacitance manometers, including the high-temperature Type 631C. Its LCD display screen is easy to read, and it also offers two (2) independently-adjustable trip relays for external device control. Its standard outputs are high-resolution (16-bit) analog output and RS232C digital, and it can be equipped with RS485 digital communications. It can also remotely zero the Type 629D manometer equipped with that option.



Type 660B Single-Channel Display/Power Supply

The Type 660B is a microprocessor-controller single-channel power supply and display that is designed for use with all un-heated and 45°C heated Baratrons. It offers a 4.5-place digital display of the Baratron's measured pressure, and has a single-menu structure for easy setup and configuration. It also offers four (4) open collector alarm trip points for control of external devices. It can be equipped with an RS232C digital interface, and it mounts in a compact 1/8 DIN package.



Type PDR2000 Dual-Channel Power Supply/ Display

The PDR2000 is a low-cost two-channel power supply/display capable of supporting most 600-series Baratron capacitance manometers. It offers a very compact size (1/8 DIN package), two (2) independently-adjustable relay trip points for external device operation, and selectable engineering units. It also can be ordered with an optional RS232C digital interface, and has the ability to scale to non-standard pressure ranges.



CV7600 Isolation Systems

The MKS CV7600 Isolation System is designed to automatically maintain a heated 600-series Baratron capacitance manometer at vacuum throughout a process cycle. The Isolation System consists of either a Type 627D or Type 628D heated process Baratron, an HPS® Pneumatic Isolation Valve, and an R750B mini-Baratron and Relay Module. The R750B Relay Module monitors the process pressure, and provides a contact closure that is used to open or close a (customer-supplied) isolation valve in the pneumatic line to the HPS Pneumatic Isolation Valve. This solenoid closes the HPS valve whenever the process pressure exceeds the full-scale range of the 600-series Baratron, maintaining it in its optimum working range. Many different Baratron configurations and trip point options are available; please contact the MKS Applications group or your MKS Account Manager for more information.

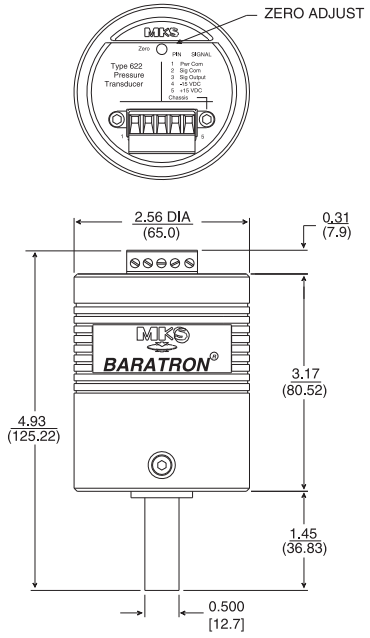
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

600-Series Baratron Displays and Power Supplies

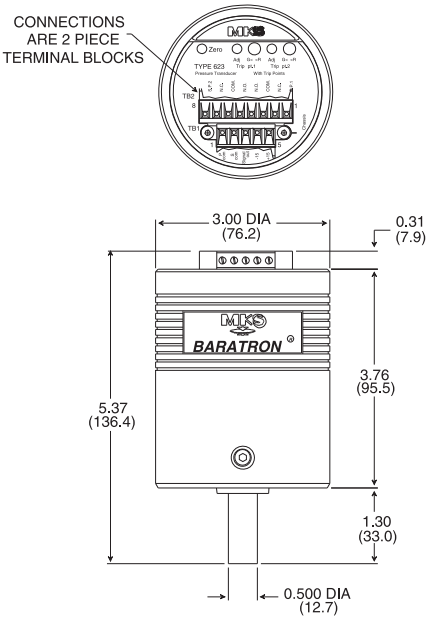
Power Supplies/ Digital Readouts	Type 146C Multi-gauge controller for use in complex vacuum systems and experiments	Type PR4000 Economical single/dual channel digital readout	Type PDR2000 Standard series two-channel digital readout	Type 660B Single-channel digital readout with multiple set points
Display Type	Custom LCD screen with multiple numeric displays	Digital, 4½-place LCD	Digital, 4-place Red LED	Digital, 4½-place LED
Number of Channels	1 to 4	1 Type 4000AS 2 Type 4000AF	2	1
Input Power Required	90 to 270VAC, 50-60 Hz	115/230 VAC, 50/60 Hz	Universal input; 110-240 VAC; 47-63 Hz, 40 VA, IEC 320 instrument power input receptacle	Standard: 120 VAC ±10, 50/60 Hz Optional: 240, 100, or 220 VAC
Input Signal	0 to 10 VDC or 0 to 5 VDC	0 to ±10 VDC 0 to ±5 VDC Other, scalable	0 to +10 VDC	0 to ±10 VDC
Power Supply Output	±15VDC at 2.0 amps	±15 VDC @ 0.8 Amps ±15 VDC @ 1.5 Amps 24 VDC @ 1 Amp	±15 VDC @ 750 mA	±15 VDC ±5% @ 0.25 Amps max.
Signal Output (analog)	(1) 0-10VDC per channel, linear or logarithmic	1 analog output per channel with 16 bit resolution	Linear, 4 VDC for F.S. output, (0.5 VDC per decade), 0-10 VDC each transducer	0 to ±10 VDC capacitance manometer passed through, not zeroed
Signal Output (digital)	n/a	Optional RS-232, RS-485	Linear, 4 VDC for F.S. output, (0.5 VDC per decade), 0-10 VDC each transducer	Optional: RS-232 interface outputs pressure and alarm status, and provides setup input of alarm trip points, hysteresis, and display zero
Trip Points	(2) fully programmable standard; options for up to (8) fully programmable	2, fully programmable	Two relays, contacts rated at 2 Amps @ 30 VDC	4 open collector transistors (2 high, 2 low) with adjustable hysteresis and status LEDs; adjustable from 1 to 100% F.S.
Trip Point Relay Ratings	1.0 amp @ 30VDC	2 5PDT, 2 Amps @ 30 VDC, 1 Amp @ 230 VAC	Two relays, contacts rated at 2 Amps @ 30 VDC	Open collector transistors rated for 50 Volts/100 mA max.
Operating Temperature Range	10 to 40°C	15° - 40°C	2° - 50°C	0° - 55°C
Compatible Instruments	All MKS 600-series, 700-series, and 800-series Baratrons; MKS Types 1179, 1559, 1679 Mass Flow Controllers; any mass flow controller requiring ±15VDC input power and 0-5VDC setpoint; HPS Pirani vacuum sensors; HPS cold cathode ionization sensors; most commercial Bayard-Alpert hot ionization vacuum tubes; and many convection/ Pirani vacuum gauge sensors.	Type 622, 623, 624, 625, 626, 627, 628*; Other MKS products: Type 120*, 220, 223, 230*, 430, 619*, 621*, 631*, 722, 740, 750, 850, 852, 870, 872 capacitance manometers; Type 640 pressure controller; Type 358, 558, 179 mass flow meters, Type 1179, 1559 mass flow controllers	628 (one only); Other MKS products: Type 622, 623, 624, 627, 722 750, 850, 852, 870, 872, 223 (unidirectional only),	Type 622, 623, 624, 626, 627; Other MKS products: Type 223, 722, 740, 750, 850, 852, 870, 872 capacitance manometers; Display only for Type 120, 220, 619, 621, 631 capacitance manometers; Type 358, 558, 179 mass flow meters
Mounting	1/2 rack x 3U high	Half 19-inch rack mount	1/8" DIN enclosure; 94 mm x 47 mm x 165 mm	1/8 DIN case; 96 mm x 48 mm x 140 mm, case mounts in 92 mm x 45 mm panel cutout.
Channel Selection	Remote or local; multiple display modes	Dual display	User selected by front panel push button	n/a
Additional Information	RS232C digital communications; remote or local operation through front panel; fully CE compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends.	Wide array of standard features. Options for digital communicators and high power output for temperature-controlled manometers Fully CE Compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends.	RS-232 (9600 baud, 8 data bits, no parity, 1 stop bit) Low cost, compact enclosure for two manometers Fully CE Compliant to EMC Directive 89/336/EEC	For use with both capacitance manometers and mass flow meters; input scaler provides direct reading for any sensor range; display can be remotely zeroed. Fully CE Compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends.

**Subject to total power consumption of connected instrument(s) and PR4000 options*

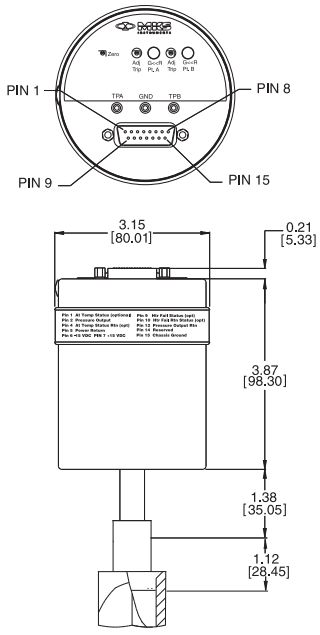
Type 622B



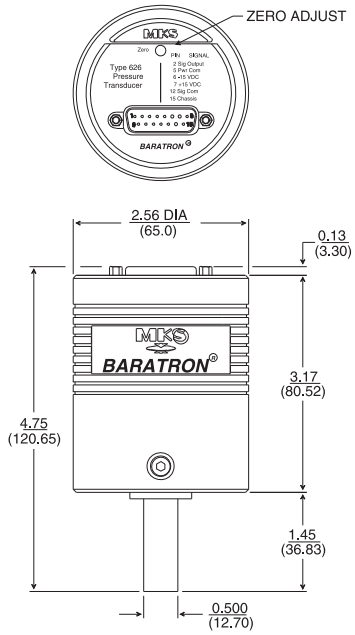
Type 623B



Type 624D and 625D
Type D24D and D25D



Type 626B

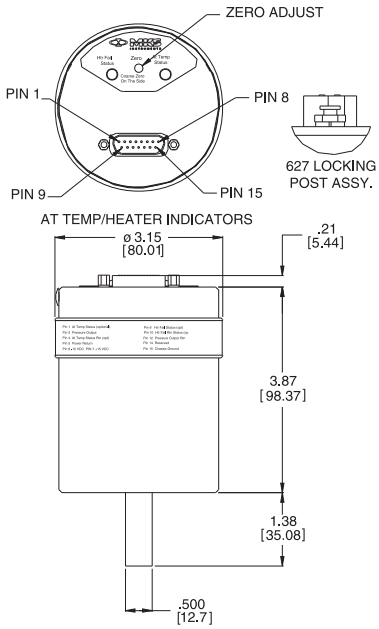


Dimensional Drawing —

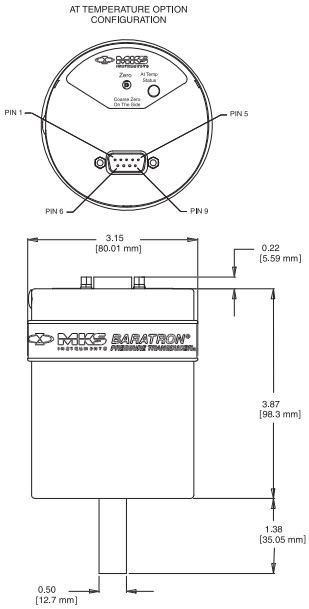
Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Dimensional Drawings

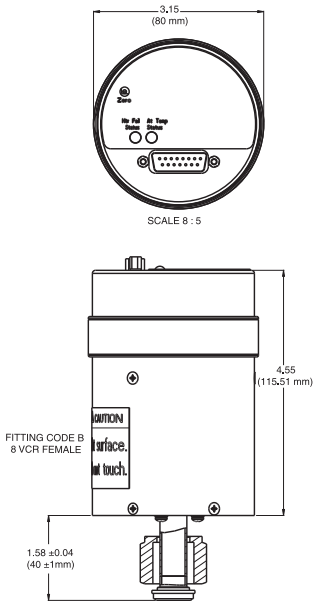
Type 627D and 628D
Type E27B and E28D
Type D27D and D28D



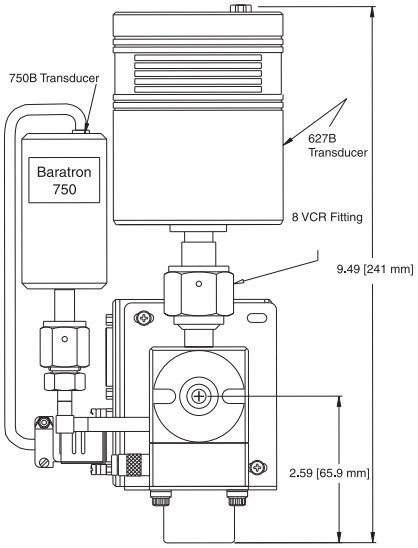
Type 629D
Type E29D



Type 631C



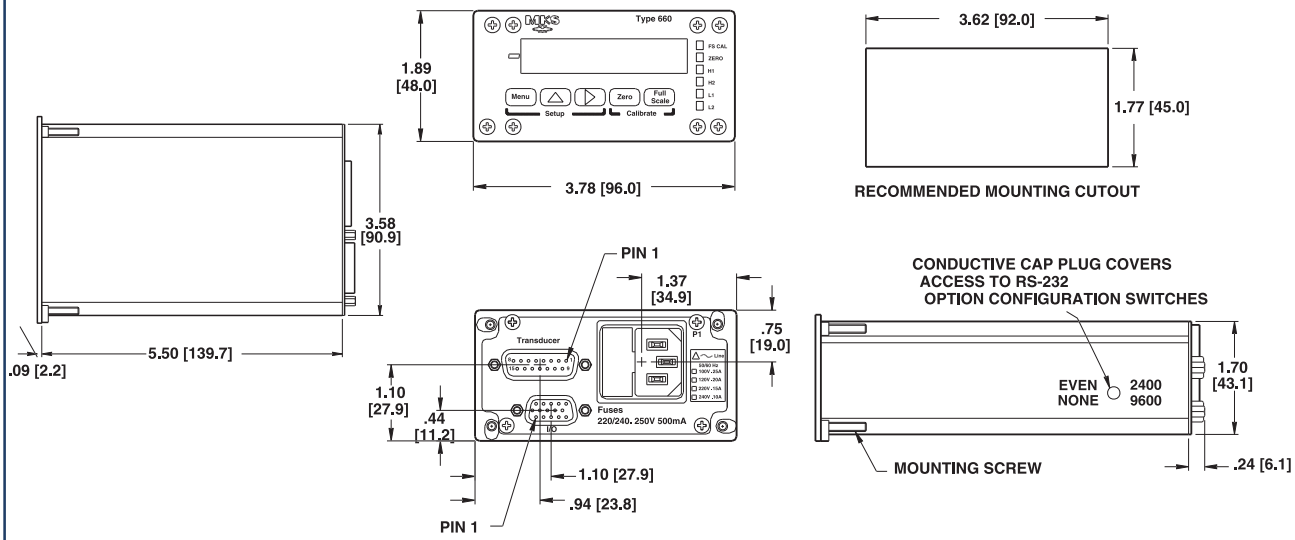
Type CV7627



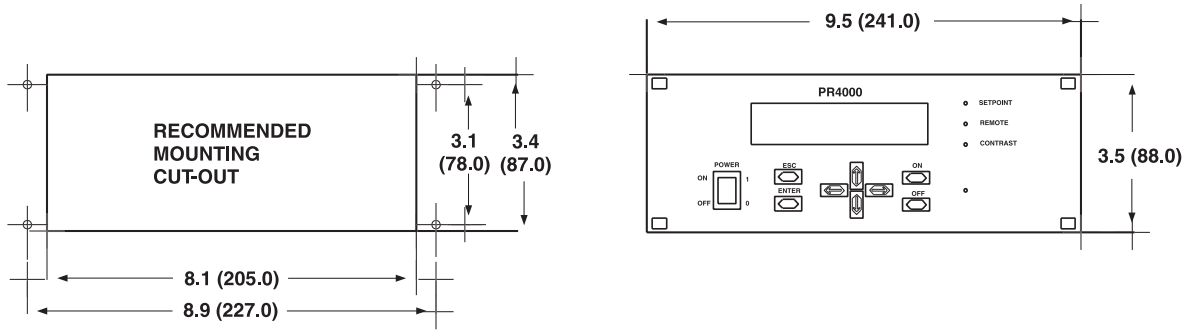
Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

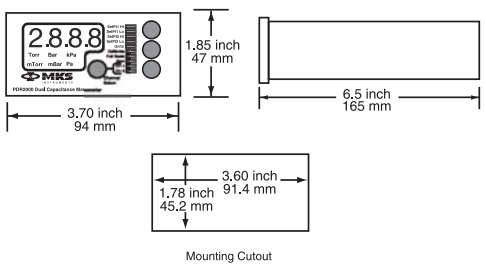
Type 660B



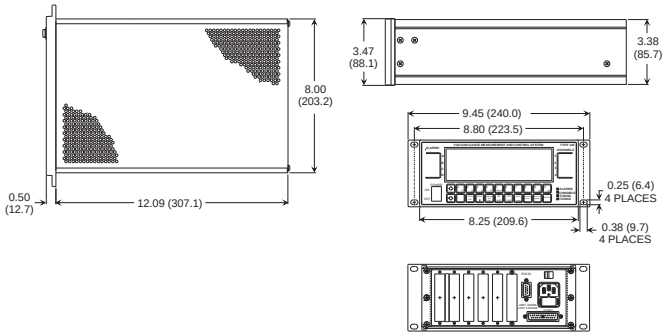
Type PR4000



Type PDR2000



Type 146C



Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Ordering Information

Types 622B, 623B, 626B, 627D, 628D, E27D, and E28D

Ordering Code Example: 627D11TBC1B	Code	Configuration Example
Absolute Capacitance Manometers		
Ambient temp; terminal block connector; standard sensor	622B	627D
Ambient temp; relays; terminal block; standard sensor	623B	
Ambient temp; 15-pin D-connector; standard sensor	626B	
45°C sensor temp; 15-pin D-connector; standard sensor	627D	
100°C sensor temp; 15-pin D-connector; standard sensor	628D	
45°C sensor temp; 15-pin D-connector; etch sensor	E27D	
100°C sensor temp; 15-pin D-connector; etch sensor	E28D	
Pressure Ranges Full Scale (Torr)		
0.02 (available on 627D and E27D)	U2T	11T
0.05 (available on 627D, E27D, 628D, E28D)	U5T	
0.10 (not available on 622B, 623B)	.1T	
0.25 (not available on 622B, 623B)	RET	
1 (not available on 623B)	01T	
2 (not available on 623B)	02T	
10	11T	
20	21T	
100	12T	
200 (available on 623B, 627D, 628D)	22T	
500 (not available on E27D, E28D)	52T	
1000 (not available on E27D, E28D)	13T	
2000 (available on 627D, 628D)	23T	
5000 (available on 627D, 628D)	53T	
10,000 (available on 627D, 628D)	14T	
15,000 (available on 627D, 628D)	RBT	
20,000 (available on 627D, 628D)	24T	
25,000 (available on 627D, 628D)	RCT	
Fittings		
1/2" OD (12.7 mm) tubulation	A	B
Swagelok 8 VCR, female	B	
1.33" OD Conflat, rotatable[1]	C	
NW16-KF[2]	D	
NW25-KF[2]	Q	
Swagelok 8 VCO, female	E	
2.75" OD Conflat, rotatable[1]	L	
Accuracy (% of Reading)		
0.12% (627D and E27D 1 Torr range and higher)	C	C
0.15% (627D and E27D in 0.25, 0.10, 0.05 Torr ranges)	D	
0.25% (622B, 623B, 626B, 628D, E28D, and 0.02 Torr 627D and E27D)	E	
0.50% (628D and E28D in 0.25, 0.10, 0.05 Torr ranges)	F	
Options		
Standard configuration, vertical calibration (627D, E27D, 628D, E28D only; 1 Torr and higher)	1	1
Temperature/Heater status, vertical calibration (627D, E27D, 628D, E28D only; 1 Torr and higher)	2	
Standard configuration, horizontal calibration (E27D, E28D only; < 1 Torr)	5	
Temperature/Heater status, horizontal calibration (E27D, E28D only; < 1 Torr)	6	
Connector		
15-pin D-connector, thread locks (627D, E27D, 628D, E28D only)	B	B
15-pin D-connector, slide locks (627D, E27D, 628D, E28D only)	P	

[1]Available only on ranges of 1000 Torr and less.
[2]Available only on ranges of 5000 Torr and less, and 2000 and 5000 Torr ranges require use of an HPS overpressure ring.
[3]Other relay settings and logic available; contact MKS Applications for assistance.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Types 624D and 625D

Ordering Code Example: 624D11TCECB	Code	Configuration Example
Absolute Capacitance Manometers		
45°C sensor temperature, relays	624D	624D
100°C sensor temperature, relays	625D	
Pressure Ranges Full Scale (Torr)		
1	01T	11T
2	02T	
10	11T	
20	21T	
100	12T	
500	52T	
1000	13T	
2000	23T	
5000	53T	
10000	14T	
15000	RBT	
20000	24T	
Fittings		
1/2" OD (12.7 mm) tubulation	BA	CE
Swagelok 8 VCR, female	CE	
1.33" OD Conflat, rotatable[1]	HA	
NW16-KF[2]	GA	
NW25-KF[2]	GC	
Accuracy (% of Reading)		
0.12% (624D only)	C	C
0.25% (625D only)	E	
Electrical Connector		
15-pin D-connector, thread locks	B	B
15-pin D-connector, slide locks	P	
Terminal block adaptor	U	

Type 631C

Ordering Code Example: 631C11TBFHBA	Code	Configuration Example
Absolute Capacitance Manometers		
15-pin D-connector	631C	631C
Pressure Ranges Full Scale (Torr)		
1	01T	11T
2	02T	
10	11T	
30	31T	
100	12T	
1000	13T	
Fittings		
1/2" OD (12.7 mm) tubulation	A	B
Swagelok 8 VCR, female	B	
NW16-KF	D	
1.5" OD Sanitary	M	
2.0" OD Sanitary	N	
Accuracy (% of Reading)		
0.50%	F	F
Sensor Temperature		
150°C	H	H
200°C	P	
Relay Configurations[3]		
No relays	None	BA
TP-A activates above 50% FS; TP-B activates above 50% FS	AA	
TP-A activates above 50% FS; TP-B activates below 50% FS	AB	
TP-A activates below 50% FS; TP-B activates below 50% FS	BB	
TP-A activates below 50% FS; TP-B activates above 50% FS	BA	

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ordering Information

Types 629D and E29D

Ordering Code Example: 629D11TBCJ4B	Code	Configuration Example
Absolute Capacitance Manometers		
9-pin D-connector, standard sensor	629D	629D
9-pin D-connector, etch sensor	E29D	
Pressure Ranges Full Scale (Torr)		
0.02 (available on 45°C models only)	U2T	11T
0.05	U5T	
0.10	.1T	
0.25	RET	
1	01T	
2	02T	
10	11T	
20	21T	
100	12T	
1000 (available on 629D only)	13T	
Fittings		
1/2" OD (12.7 mm) tubulation	A	B
Swagelok 8 VCR, female	B	
1.33" OD Conflat, rotatable[1]	C	
NW16-KF[2]	D	
Swagelok 8 VCO, female (629D only)	E	
Accuracy (% of Reading)		
0.12% (45°C products in 1 Torr range and higher)	C	C
0.15% (45°C products in 0.25, 0.10, 0.05 Torr ranges)	D	
0.25% (100°C products 1 Torr range or higher, and 0.02 Torr 45°C products)	E	
0.50% (100°C products in 0.25, 0.10, 0.05 Torr ranges)	F	
Sensor Temperature		
45°C	J	J
100°C	L	
Options		
Standard configuration, vertical calibration	1	4
Heater status indication, vertical calibration	2	
External zero, vertical cal (N/A for 0.02 Torr or 100°C/0.05 Torr products	3	
Heater status, external zero, vertical cal (N/A for 0.02 Torr or 100°C/0.05 Torr products)	4	
Standard configuration, horizontal calibration (< 1 Torr only)	5	
Heater status indication, horizontal calibration (< 1 Torr only)	6	
External zero, horizontal cal (45°C products with 0.05, 0.10, 0.25 Torr ranges; 100°C products with 0.10 and 0.25 Torr ranges)	7	
Heater status, external zero, horizontal cal (45°C products with 0.05, 0.10, 0.25 Torr ranges; 100°C products with 0.10 and 0.25 Torr ranges)	8	
Connector		
9-pin D-connector, thread locks	B	B
9-pin D-connector, slide locks	P	

Ordering Information

Types D24D and D25D

Ordering Code Example: D24D11TBCB0	Code	Configuration Example
Absolute Capacitance Manometers		
Dual range, 45°C sensor temperature, relays	D24D	D24D
Dual range, 100°C sensor temperature, relays	D25D	
Pressure Ranges Full Scale (Torr)		
10	11T	11T
100	12T	
1000	13T	
Fittings		
1/2" OD (12.7 mm) tubulation	A	B
Swagelok 8 VCR, female	B	
1.33" OD Conflat, rotatable	C	
NW16-KF	D	
Accuracy (% of Reading)		
0.12% (D24D only)	C	C
0.25% (D25D only)	E	
Electrical Connector		
15-pin D-connector, thread locks	B	B
15-pin D-connector, slide locks	P	
Secondary Range Gain Ratio		
2 to 1	2	0
5 to 1	5	
10 to 1	0	

Types D27D and D28D

Ordering Code Example: D27D11TCEC1B0	Code	Configuration Example
Absolute Capacitance Manometers		
Dual range, sensor temperature 45°C	D27D	D27D
Dual range, sensor temperature 100°C	D28D	
Pressure Ranges Full Scale (Torr)		
1	01T	11T
10	11T	
100	12T	
1000	13T	
Fittings		
1/2" OD (12.7 mm) tubulation	BA	CE
Swagelok 8 VCR, female	CE	
Swagelok 8 VCO, female	DA	
NW16-KF	GA	
1.33" OD Conflat, rotatable	HA	
Accuracy (% of Reading)		
0.12% (1 to 1000 Torr only, D27D)	C	1
0.25% (1 to 1000 Torr only, D28D)	E	
Orientation/Calibration		
Vertical calibration (standard for 1 to 1000 Torr)	1	B
Horizontal calibration (< 1 Torr only)	5	
Electrical Connector		
15-pin D-connector, thread locks	B	0
15-pin D-connector, slide locks	P	
Secondary Range Gain Ratio		
2 to 1	2	0
5 to 1	5	
10 to 1	0	

mks
Technology for Productivity

Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810

Tel: 978.645.5500
Tel: 800.227.8766 (in U.S.A.)
Web: www.mksinst.com

600Series_RoHS - 2/09

© 2009 MKS Instruments, Inc.
All rights reserved.

Specifications are subject to change without notice.

Baratron® and HPS® are registered trademarks of MKS Instruments, Inc., Andover, MA. Inconel® and Incoloy® are registered trademarks of Inco Alloys International, Inc., Huntington, WV. Swagelok®, VCR® and VCO® are registered trademarks of Swagelok Corp., Solon, OH. Conflat® is a registered trademark of Varian Associates, Inc., Lexington, MA.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP